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## GEOLOGY AND PALEONTOLOGY.

**Geology of Eastern Siberia.**—The *Investia* of the East Siberian Geographical Society (Vol. xxiii, 3) contains an account of M. Obrutcheff's further researches in the Olekma and Vitim highlands. In the northeastern part of this region the author found a further continuation of the "Patom plateau"—that is, a swelling from 3500 to 4000 ft. high, devoid of trees, with ridges and mountains rising over it to heights of from 5000 to 5600 feet. They consist of granite and crystalline schists, probably of Laurentian age, covered with younger, probably Huronian, gneisses and schists. The other parts of the highlands consist of Cambrian and Ordovician deposits, while Silurian limestones and Devonian Red sandstones are met with in the Valley of the Lena. We thus have a further confirmation of the hypothesis, according to which the great plateau of northeastern Asia is a remnant of an old continent which has not been submerged since the Devonian epoch. Further traces of mighty glaciation have been found in the southeastern part of the region. As to the gold-bearing deposits, they are pre-glacial in the south and post-glacial in the north. The high terraces in the valleys are indicative of a considerable post-pliocene accumulation of alluvial deposits, and of a subsequent denudation on a large scale. (*Nature*, Jan. 12, 1893).

**Geological Features of Arabia Petræa and Palestine.**—

At a recent meeting of the London Geological Society, the following communication was read by Professor Edward Hull on the Geology of Arabia Petræa and Palestine:

The most ancient rocks (Archean) are found in the southern portion of the region; they consist of gneissose and schistose masses and are penetrated by numerous intrusive igneous rocks. They are succeeded by the Lower Carboniferous beds of the Sinaitic peninsula and Moabite tableland consisting of bluish limestone with fossils, which have their counterparts chiefly in the Carboniferous limestone of Belgium, and of a purple and reddish sandstone (called by the author "the Desert Sandstone," to distinguish it from the Nubian Sandstone of Cretaceous age), lying below the limestone. The Nubian Sandstone, separated from the Carboniferous by an enormous hiatus in the succession of the formations, is probably of Neocomian or Cenomanian age, and is succeeded by white and gray marls, and limestones with

flint, with fossils of Huronian and Devonian ages. The Middle Eocene (Nummulitic Limestone) beds appear to follow on those of Cretaceous age without a discordance, but there is a real hiatus notwithstanding the apparent conformity, as shown by the complete change of fauna. In Philistia a calcareous sandstone in which no fossils have been discovered is referred to the Upper Eocene; for the Miocene period was a continental one, when faulting and sliding were taking place, and the main physical features were developed—e. g., the formation of the Jordan-Arabah depression is referable to this period.

In Pliocene times a general depression of land took place to about 200–300 feet below the present sea-level, and littoral deposits were formed on the coasts and in the valleys. To this period belong the higher terraces of the Jordan-Arabah valley. The Pliocene deposits consist of shelly gravels. Later terraces were formed at the epoch of the glaciation of the Lebanon Mountains, when the rainfall was excessive in Palestine and Arabia.

The volcanoes of the Jaulân, Hauran, and Arabian Desert are considered to have been in active operation during the Miocene, Pliocene, and Plistocene periods, but the date of their final extinction has not been satisfactorily determined. (Geol. Mag., Jan., 1893).

### The Vertebrate Fauna of the Ordovician of Colorado.—

Mr. Charles D. Walcott has recently published a paper on the vertebrate fauna in strata of Ordovician age near Canyon City, Colorado, already noticed in THE NATURALIST. The fossils consist of what appear to be the plates and scales of fishes and the ossified chordal sheath of a fish allied to the recent *Chimaera*. The remains occur in a sandstone which is correlated with the lower Trenton and the lower Bala of Wales. Microscopic sections of a dermal plate belonging to an *Asterolepis*-like form, examined by Dr. Otto Jaekel, show (1) the dentine tubules that are characteristic of vertebrates; (2) the occurrence of true osteoblasts, which exclude the forms from the Elasmobranchii, and relegates them to other low divisions of the fishes; (3) the absence of enamel and the distinct concentric lamination of the dentine tubules which indicate a low stage of development.

In view of the objections that can be made to a classification based entirely upon the characters of the dermal plates and scales Mr. Walcott has made his classification tentative and has only outlined the characters of the fragmentary remains. For the present, then, the fossils will be known respectively as *Dictyorhabdus priscus*, a supposed chimaeroid, and *Astraspis desideratum* and *Eriptychus americanus*,

rhhipidopterygians. It is, however, extremely unlikely that these forms are fishes, but they are more likely Agnatha.—*Bull. Geol. Soc. Am.*, Vol. 3, pp. 153–172. C.

**The Loess in Southern Russia.**—In his notes on Russian Geology Mr. W. F. Hume gives an interesting account of the Russian Loess, its character and distribution, together with a theory of its origin.

The Russian Loess is a yellowish-brown sandy clay, often rich in grains of quartz and mica, and in many places rich in carbonate of lime and humus. It lies unconformably on all the principal formations. To the west of the Dnieper it conceals the broken and contorted gneisses and granites of the Archean axis in S. Ekaterinoslav and the Don Cossack country it covers the shales and sandstones of the Carboniferous, whilst in the more central governments of Kursk, Karkoff, and Tchernigov it overlies the Cretaceous and the whole Tertiary series. Also along a definite line running to the north of these governments it rests upon the Boulder-clays and sands of the Glacial period. From its general appearance Mr. Hume considers the Loess of Russia to be more or less coeval with that of Central and Western Europe, and the paleontological evidence seems to confirm his view.

In discussing the origin of the Loess Mr. Hume calls attention to the relation, pointed out by Professor Suess between the Loess and the Glacial Drift, and gives in detail the theories of Professor Armachevsky and Baron von Richthofen, neither of which is sufficient in itself to account for the distribution of the Loess.

In conclusion the author gives the following statement of the probable sequence of events:

1. The Loess particles may be originally derived from the finely ground material resulting from the wearing of the subjacent beds by the ice-sheet.

- II. The same have been deposited in tundra-like depressions under the influence of slowly moving waters or by the action of rivers in flood.

- III. This deposit under more temperate conditions dried up, and was then suitable material for the redistributive action of the wind.—(*Geol. Mag.*, Dec., 1892).

**Sources of the Texas Drift.**—Mr. Dumble divides the Texas drift area into four districts. First the Trans-Pecos Texas, the valley of the Rio Grande, and the Rio Grande Divide. The origin of this

drift is traceable to the mountainous region of Trans-Pecos Texas, where nearly every variety of pebble can be found in its original location. Second, the country between the Nueces and the Brazos. This region is covered with pebbles, gravel and sand derived from the rocks found in the Central mineral region. Third, from the Brazos to the Sabine, where the gravel is largely made up of ferruginous material which had its origin in the iron-capped hills which cover so large a portion of Eastern Texas. Fourth, the area known as Northwest Texas according to the survey division. The drift of this region came from the hills enclosing the waters under which they were deposited, viz., Wichita Mountains and the mountains of New Mexico.—Trans. Texas Acad. Sci., Vol. i, 1892.

**Archean.**—According to Mr. H. V. Winchell, Minnesota possesses the greatest iron district known in the world to-day. It lies in the Mesabi range and extends from the Canadian boundary line in a direction a little south of west, beyond the Mississippi River, a distance of 140 miles. The ore on the eastern end is hard, black and magnetite, owing to the heat of the gabbro overflow. In the central and western portions of the range the ore is soft hematite, limonite and goethite. As to the source of the iron, it is believed by Mr. Winchell to be largely the result of oceanic deposition, both chemical and mechanical, and to have been concentrated in its present situations. (Twentieth Ann. Rept. Minn. Geol. Surv., 1892).—Mr. T. R. Struthers advances the theory that the primitive rocks, *i. e.*, granite, were formed by the cooling of the exterior of the globe under the primeval deep. The pressure of the sea at the depth of two miles would be sufficient to account for the structure of granite. This theory explains the features presented by the bedded or stratified granite of the British islands and many other parts of the world. (Geol. Mag., Dec., 1892.)

**Paleozoic.**—A skull of *Dinichthys intermedius* recently examined by Professor E. W. Clapp supplies details previously unknown regarding the plates of which it is composed. The especial points of interest are the forms of some of the plates and the over and underlap which has not been represented, and some additions to the structure of the upper jaw. (Am. Geol., Oct., 1892).—Mr. Herbert Bolton reports a trilobite from the Skiddaw slates of the Isle of Man. The specimen belongs to one of two genera, *Asaphus* or *Æglina*, both of which are Ordovician forms. This in connection with the occurrence of two specimens of Palæochorda (an Arenig form) is strong evidence that

the Skiddaw slates are of Llandeilo age. (Geol. Mag., Jan., 1893).—A species of *Cyclus* from the Coal Measures of Lancashire, England, is described and figured in the Geol. Mag., Jan., 1893, by Dr. Woodward. The fossil is about as large as a shilling and resembles *C. agnotus* H. von Meyer. Mr. Woodward considers it a new species, and names it *Cyclus scottii*.

**Mesozoic.**—A new crustacean, *Prosopon etheridgei*, from the Cretaceous beds of Queensland is described by Dr. Henry Woodward. This crustacean is closely related to *P. verrucosum* Reuss, and *P. tuberosum*, von Meyer, two Neocomian species from the Cretaceous of Boucheras, Dept. Jura. It differs from both, however, in several important points. (Proceeds. Linn. Soc. N. S. W., Vol. vii, 1892).—Mr. R. Etheridge reports a new fossil Phyllopod from the Upper Coal Measures of the Newcastle District, N. S. W., belonging to the genus *Leaia*. This is the second genus of that family known from the whole of Australia. Mr. Etheridge has named the species *Leaia mitchellii* in honor of its discoverer, Mr. Mitchell. (Proceeds. Linn. Soc. N. S. Wales, Vol. vii, 1892).

**Cenozoic.**—Mr. J. H. Cooke reports finding the jaw of an Arctic bear, *Ursus arctos* in pleistocene strata of Malta. The fossil, consisting of an entire ramus with its canine and molar teeth, was found in a cavern together with bones of elephants, hippopotami, a stag, and a large dog. (Knowledge, Dec. 1, 1892).—According to Baron DeGeer the Pleistocene changes of level in North America as well as in Europe, are closely connected with the local structure of the earth's crust and with the local extension of the glaciations, and that these changes cannot be accounted for by changes in the level of the sea. (Amer. Geol., Jan., 1893).—M. Bureau has described two fossil plants from the Calcaire *grossier parisien*. The first, called by the author *Aralia eocenica*, is represented by an impression of a leaf remarkable for the slender, long petiole. The second, *Monochoria parisiensis*, resembles strongly certain species of living *Monochoria* found in India, Ceylon, Malay, China and Japan. (Revue Scientifique, Jan., 1893).